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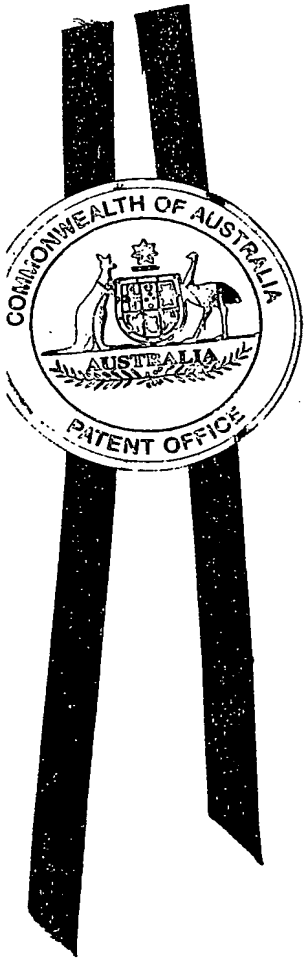

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Seventh day of December 2004

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MANAGER EXAMINATION SUPPORT
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AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

Applicants:

GRAM ENGINEERING PTY LTD

Invention Title:

FENCE PLINTH

The invention is described in the following statement:

FENCE PLINTH

Field of the Invention

The invention relates to fencing and more specifically to fence elements, known as plinths, used at the base of a fence construction. The invention has been developed especially, but not exclusively, for metal fencing systems and is herein described in that context. It is to be appreciated however, that the invention has broader application and is not limited to that use.

Background

It is often desirable in the construction of fences to have the fence closely follow the contour of the surrounding landscape. Such an arrangement inhibits noise, vermin, weeds, plants, wind, etc from passing under the fence.

To allow the fence to follow the ground contour, in the past plinths have been installed under the main infill panel. These plinths are typically constructed from concrete, stone, or timber and are either independently supported in the ground or secured to the fence posts. The plinths may be partially embedded in the ground and as such, are also often used to retain soil where the ground level is uneven.

Timber planks have been used extensively to construct plinths as they have sufficient strength to retain soil for small differences in soil height, and they can be relatively easily cut to size on site. However, the timber is usually chemically treated to make it resistant to pests, such as termites, and there is a tendency for these chemicals to leach into the soil. As these chemicals are highly toxic, this can lead to unacceptable

contamination of the surrounding environment. Also timber plinths are relatively bulky and heavy which give rise to handling and installation difficulties.

Summary of the Invention

According to a first aspect, the invention relates to a fence plinth formed from pre-painted galvanised sheet steel having spaced apart end edge margins and being profiled to incorporate stiffening formations that extend along the sheet between the end edge margins.

In one form, the edge margins are mountable to the posts.

In one form, the plinth is made from sheet metal that incorporates a protective coating, such as that provided by a zinc galvanized coating, and a paint coating as applied to pre-painted steel strip in a continuous manner.

In one form, the stiffening formations may be corrugations or ribs such that a cross-sectional profile of the plinth displays a regular wave form with crests and troughs displaced from a notional centre plane of the sheet. The wave form may be smoothly curved throughout, or it may comprise straight portions intersecting at relatively abrupt angles, or a combination of both these possibilities.

In another form, the stiffening formations may be in the form of one or more ribs and adjacent pans that extend across the sheet.

In yet another form, the sheet material may be shaped or folded to form a structural section such as a z-section to provide for stiffening of the plinth.

In profiling the sheet to form the stiffening formation, it is preferable that the radius of curvature of the bends in the sheet are at least 5mm, and preferably at least 7mm. In this way cracking of the pre-painted

coating is minimised thereby inhibiting subsequent corrosion of the plinth.

In one form, the sheet material has opposite side margins that interconnect the end edge margins, the side edge margins being configured to allow lapping of one side margin with the other side margin of another plinth to form a plinth assembly with the overlapping region forming a region of increased stiffness in the plinth assembly.

In one form, the partially overlapping plinths nest one within the other.

An advantage of configuring the plinths so that they can be lapped is that it is possible to create plinth assemblies of any height. In a further form, the sheet is profiled to allow stacking of the plinths, typically for transport and handling. In particular, the stacking is such that the plinths overlap with one plinth nesting within the other plinth thereby minimising the space taken by the nested plinths.

In one form, the posts of the fence include respective channels that face towards one another and wherein in use the edge margins locate within the channels and are secured thereto. In another form, the edge margins extend across an outer surface of the posts.

In one form, the sheet is profiled to extend laterally out of a notional centre plane extending between the upper and lower margins so that the edge margins of the plinth locate snugly within the channels of the fence.

In one form, the ratio of the height of the plinth, measured between the opposite side edges of the plinth to the length of the plinth, measured between the end edges of the plinth, is in the range of 0.3 - 0.10. In one form, the height of the plinth is in the range of 100mm-200mm, and more preferably 150mm, whereas the length of

the plinth is between 2m-3m, and more preferably approximately 2.7m.

In a particular form, the sheet material of the plinth is profiled so that the major services of the plinth allow free drainage of water across those surfaces when the plinth is disposed in its in use orientation. In this way, water does not pool on the surface of the plinth which could otherwise promote corrosion of the plinth.

In yet a further form, the invention is directed to a fence comprising spaced apart fence posts, each including a channel with a channel of one post facing the channel of the other post, and a plinth according to any form described above. The plinth extends between the posts with the end edge margins of the plinth located within the respective ones of the fence channels.

In a particular form, the fence further comprises a plurality of plinths located one above the other and having their end edge margins located in respective ones of the fence post channels, each of the plinths being arranged in partial overlapping relationship to form a plinth assembly with the edge overlapping region forming a region of increased stiffness in the plinth assembly that extends between the fence posts.

In yet a further aspect, the invention relates to a fence comprising two spaced apart posts that include respective channels that face toward one another, the plinth being formed from sheet material having opposite side edges, and end edges that interconnect the side edges, the plinth being profiled to extend laterally out of a notional centre plane extending between the side edges so that in use the end edge margins of the plinth locate snugly within the channels.

A fence in accordance with the third aspect of the invention may also have the plinth profiled so is to incorporate at least one stiffening formation that is characteristics of the first aspect of the invention.

In one form, the sheet materials may be profiled so that the plinth forms a partially closed section having opposite side walls interconnected by a bridging portion. In this arrangement, the side walls are spaced apart at least along a portion of their width so as to locate snugly against the side walls of the channel. The plinth may be shaped with the bridge portion being linear, curved or distinctly angled.

In one form, the edge margins of the plinths are spaced from the base portion of the fence post channel to allow the plinth to be manipulated into, and out of, register with the channels when a barrier panel is in place above the plinth.

Forming the plinth from sheet material provides enhanced flexibility in the design of the fence construction as compared to the traditional timber plinths. The choice of profile on the plinth may be designed to match the expected design loading which is anticipated for the fence construction. The plinth is easier to handle as it is lightweight and can be stacked with other plinths in a nested arrangement for ease of transporting. By making the plinth from a pre-painted pre-galvanised steel sheet, it will not leach dangerous chemicals into the soil as in the case of plinths formed from treated timber.

In addition, some types of existing plinths suffer from insufficient strength to resist bowing when there is significant soil height differences on one side of the plinth (as often happens on sloping ground). They are not

designed to overlap in a manner allowing the combination of one or more plinths to locate one above the other to cater for greater variation in soil height from one side to the other side of a fence as provided by embodiments of the present invention. In the past, plinths have not been available in a paint finish that is the same as the one used for a pre-coated metal fence itself, thus suffering from poor aesthetics and differential fading over a long period of time. Paint applied to existing plinths is typically post applied by brush or spray or powder-coating and is applied to each plinth section in a batch or non-continuing process. Where paint is applied to a plinth it needs to have sufficient thickness to ensure it resists the degradation through moisture penetration and may occur in applications involving contact with the soil. An advantage of making the plinth from pre-painted, pre-galvanised steel sheet is that these problems are obviated.

Also in one form of the invention, the plinth may be installed or removed after installation of the balance of the fence thereby further improving the flexibility of the design. Finally, the provision of the plinth, separate to the barrier panel, ensures that the incorporation of the plinth does not compromise the life of the other portions of the fence.

According to a further aspect, the present invention provides a fencing comprising two spaced apart posts, a barrier panel extending between and mounted to the posts, and a plinth located below the barrier panel, wherein the posts include respective channels that face towards one another, and the plinth is formed from sheet material having spaced apart edge margins which are located within the channels and mounted thereto, the sheet being profiled

to incorporate a stiffening formation that extends along the sheet between the posts.

In yet a further aspect, the invention relates to a fence comprising of two spaced apart posts, a barrier panel extending between and mounted to the posts, and a plinth located below the barrier panel, wherein the posts includes respective channels that face toward one another, and the plinth is formed from sheet material having spaced apart upper and lower longitudinal edges, the sheet being profiled to extend laterally out of a notional centre plane extending between the upper and lower edges so that the edge margins of the plinth locate snugly within the channels.

Typically, each barrier panel comprises upper and lower rigid rails, and infill means extending from rail to rail. Infill means may be an impervious rigid sheet, a roll formed profile sheet, a rigid sheet of expanded sheet of expanded metal, a plurality of spaced apart pickets, a sheet of woven wire mesh or other substantially planar obstruction to the passage of people or animals between the posts.

In yet a further aspect, the invention relates to a method of forming fence plinths comprising the steps of:

profiling a pre-painted galvanised steel strip to incorporate longitudinal extending stiffening formations in the strip; and

shearing the strip at discrete lengths to form the plinths.

The above features and advantages of the present invention will become more apparent from the following description when taken in conjunction with the accompanying drawings in which preferred embodiments of

the present invention are shown by way of illustrative example.

Brief Description of the Drawings

In the Drawings:

Fig. 1 as a schematic perspective view of a fence;

Fig. 2 is a perspective view of a plinth used in the fence of Fig. 1;

Fig. 3 is an end view of the plinth of Fig. 2;

Fig. 4 is a section view along section line IV-IV of Fig. 1;

Fig. 5 is an end view of a plinth with an alternative profile;

Fig. 6 is an end view of a plinth with another alternative profile;

Fig. 7 is an end view of a plinth with yet another alternative profile;

Fig. 8 is a front view of a plinth assembly located between fence posts; and

Fig. 9 is side sectional view of the plinth assembly of Fig. 8.

Detailed Description of the Drawings

Fig. 1 shows a perspective view of a fencing system 10. The fencing system includes an end post 12 and intermediate post 14. Both the end post 12 and the intermediate post are typically set in a concrete foundation 16. Both posts are formed from composite sections with the end post 12 being formed from a square section 18 and a c-section 20 whereas the intermediate post includes oppositely disposed c-sections 22. The channels 24 of adjacent posts face one another so that they can receive a barrier panel 26 and plinth 28.

Each panel 26 includes a top and bottom rail (30, 32), and an infill panel 33. The infill panel may be formed as an impervious rigid sheet, a roll formed profiled sheet, a sheet of expanded metal pickets, woven wire mesh or the like.

In accordance with standard practice, the bottom rail 32 is disposed above the ground level. This is required as many proprietary fencing system warranties are avoided if the barrier panel is in contact with the ground. However it is often desirable to extend the fence to the ground to inhibit noise, vermin, wind and the like from passing under the fence. Also if the ground level is uneven, it may be beneficial to incorporate a panel with sufficient strength to act as a retaining wall at the lower end of the fence.

To this end, the plinth 28 is arranged to be mounted below the barrier panel 26 and is mounted to and supported by the fence posts 12, 14.

In traditional fence construction, the plinth 28 is formed from timber. However in the embodiment shown, and as best illustrated in Figs. 2 and 3, the plinth 28 is formed from a profiled metal sheet. The metal sheet is pre-coated with a corrosive resistant Zn/Al metal alloy and incorporates a painted overlay which typically matches the colour of the fence posts and barrier panels. A suitable steel sheet is manufactured by Bluescope Steel Limited and sold under the trademark COLORBOND® coated steel.

The plinth 28 includes an opposite side edges (34, 36) and opposite end edge margins (38, 40) which interconnect the side edges (34, 36). The plinth is typically profiled in continuous lengths using a roll forming process and cut to size. With this arrangement

the plinth includes stiffening formations 42 which extend linearly along the sheet between the end edge margins (38, 40).

In the illustrated form of Figs. 2 and 3, the plinth 28 is profiled so that the stiffening formations 42 are in the form of angular corrugations that display a regular wave form with crests 44 and troughs 46 displaced from a notional centre plane CL that extends between the side edges (34, 36). The radius of curvature at the bends is at least 5mm, and preferably at least 7 mm in order to minimise cracking of the pre-painted coating and to inhibit subsequent corrosion of the plinth 28. Each of the side edges (34, 36) also include a safety edge at its terminal end 48 that provides a safe edge for handling of the plinth 28 and can avoid additional costs in production of the plinth by removing the requirement to de-burr the edges. Also the plinth is designed to allow free drainage across its major surfaces when in its in use position, to thereby minimise pooling of water against the plinth.

The profile of the plinth 28 has substantial practical benefit. In particular, the stiffening formations 42 extend linearly between the edge margins (38, 40) and thereby increase the strength of the sheet to resist outward bowing from the plane on the fence. As such, the stiffening formations improve the strength of the sheet to resist back loading on the plinth 28 thereby allowing it to function as a retaining wall. Also as disclosed in Figs. 8 and 9, the plinth 28 may be lapped with other plinths 28^{1}, 28^{11}, to form a plinth assembly 80 that is higher than the individual plinths 28. Also the overlapping regions 81 form regions of increased stiffness that extend across the fence between the posts 24, thereby

enabling the plinth assembly 80 to accommodate soil loading.

In addition, the corrugated profile of the plinth allow some adjustment in its height by onsite expansion or compression of the profile. In addition, by having the profile extend outwardly from the notional centre plane end of the sheet allows it to fit more snugly within the fence post channels 24 as disclosed in more detailed below with reference to Fig. 4.

As illustrated in Fig. 4, the plinth 28 locates within the channels 24 of the fence posts (12, 14). Because of the profile of the plinth, the crests 44 of the plinth are designed to be in close proximity with the side walls (50, 52) of the c-sections which define the channels 24. With this arrangement, the end edge margins (38, 40) can either be easily secured to the fence posts by mechanical fasteners, such as self tapping screws 54 which extend through the channel walls (50, 52) and into the plinth 28 through the crests 44 or can be made to fit within the channels 24 in a manner that obviates the need for any separate fastening. Also, this arrangement allows for the plinth to be generally centrally located within the channels.

In addition, as best illustrated in Fig. 4, the plinth 28 may be sized to be smaller than the distance between the webs 56 of the channels, so that the edge margins (38, 40) of the plinth 28 are spaced from the webs 56. By providing this space it allows the plinth to be removed or inserted more readily from the fence posts channels 24 without requiring removal of the barrier panel 26.

Figs. 5 to 7 illustrate variations on the plinth profile. Similar to the first embodiment, the plinth is formed from continuous lengths of sheet metal.

In the arrangement of Fig. 5, the plinth is formed with a z profile with the upper and lower flanges (60, 62) forming the upper and lower edges (34, 36) respectively of the plinth, and the web 64 extending diagonally from opposite edges of the flanges (60, 62). The z section profile of the plinth 28 shown in Fig. 5 provides stiffening of the sheet to resist outward bowing.

Figs. 6 and 7 illustrate a further embodiment of the plinth which is formed as a channel section having opposite side walls (70, 72) interconnected by a bridging portion 74. In this embodiment, the bridging portion 74 forms the upper edge 34 of the plinth 28 whereas the terminal ends 76 form the lower edge 36 of the plinth 28. In the embodiment of Fig. 6, the side walls (70, 72) taper towards each other so that the bridging portion 74 is angular. In contrast, the arrangement in Fig. 7, the walls (70, 72) are generally parallel along the majority of their length with the bridging portion 74 being arcuate. Whilst the arrangements in Figs. 6 and 7 do not provide significant enhanced stiffening to outward bowing of the plinth, they allow the plinth 28 to fit snugly within the channels 24 of the fence posts and also provide a uniform external appearance on both sides of the plinth thereby increasing the aesthetic appeal of the plinth.

In the claims which follow and in a proceeding summary of the invention, expect where the concept requires otherwise due to expressed language or necessary implication, the word "comprising" and grammatical variations thereof, is used in an inclusive sense, that is

the features specified may be associated with further features in various embodiments of the invention.

It is appreciated that is the variation and modifications may be made to the parts previous described without departing from the spirit or ambit of the invention.

Claims

1. A fence plinth formed from pre-painted galvanised sheet steel having spaced apart end edge margins and being profiled to incorporate stiffening formations that extend along the sheet between the end edge margins.

2. A fence plinth as claimed in claim 1, wherein the stiffening formations are corrugations or ribs such that a cross-sectional profile of the plinth displays a regular wave form with crests and troughs displaced from a notional centre plane of the sheet.

3. A fence plinth as claimed in claim 1, wherein the stiffening formations are in the form of one or more ribs and adjacent pans that extend across the sheet.

4. A fence plinth as claimed in claims 1 or 2, wherein the plinth is profiled to form a structural section such as a z-section to provide the stiffening formations.

5. A fence plinth as claimed in any preceding claim, wherein the sheet material has opposite side edge margin that interconnect the end edge margins, the side edge margins being configured to allow lapping of one side margin with the other side margin of another said plinth to form a plinth assembly with the overlapping region forming a region of increased stiffness in the plinth assembly.

6. A fence plinth according to claim 5, wherein the one side margin nests within the other side margin at the overlapping region.

7. A fence plinth as claimed in any preceding claim, wherein the sheet is profiled to allow stacking of the plinth with another plinth where the plinths overlap with one plinth nesting within the other plinth.

8. A fence plinth as claimed in any preceding claim, wherein the sheet material is profiled so that the major

surfaces of the plinth allow free drainage of water across those surfaces when the plinth is disposed in its in-use orientation.

9. A fence plinth as claimed in any preceding claim, wherein the ratio of the height of the plinth, measured between the opposite side edges of the plinth, to the length of the plinth, measured between the end edges of the plinth, is in the range of 0.03 to 0.10.

10. A fence plinth as claimed in any preceding claim, wherein the sheet is bent to form the stiffening formations and wherein the radius of the curvature of the bends is at least 5mm.

11. A fence comprising spaced apart fence posts, each including a channel with the channel of one post facing the channel of the other post, and a plinth according to any preceding claim extending between the posts with the end edge margins of the plinth located within respective ones of the fence post channels.

12. A fence as claimed in claim 11, wherein the sheet from which the plinth is formed is profiled to extend laterally out of a notional centre plane so that the end edge margins of the plinth locate snugly within the fence post channels.

13. A fence as claimed in claim 12, wherein the end edge margins are securely located within the channels by the fit between the end edge margins and the channels of the respective posts.

14. A fence as claimed in any one of the claims 11 to 13, further comprising a plurality of said plinths located one above the other and having their end edge margins located in respective ones of the fence post channels, each of the plinths being arranged in partial overlapping relationship to form a plinth assembly with the or each overlapping

region forming a region of increase stiffness in the plinth assembly that extends between the fence posts.

15. A fence as claimed in claim 14, wherein one side margin of a said plinth nests within the other side margin of an adjacent plinth at the or each overlapping region.

16. A fence comprising two spaced apart posts that include respective channels that face toward one another, the plinth being formed from sheet material having opposite side edges, and end edges that interconnect the side edges, the plinth being profiled to extend laterally out of a notional centre plane extending between the side edges so that in use the end edge margins of the plinth locate snugly within the channels.

17. A fence as claimed in claim 16, wherein the sheet material is profiled so that the plinth forms a partially closed section having opposite side walls interconnected by a bridging portion.

18. A fence as claimed in any one of 11 to 17, wherein the end edge margins of the plinth are spaced from at least one web of the fence post channels to allow the plinth to be manipulated into, and out of, register with the channels.

19. A fence as claimed in any one of claims 11 to 18, further comprising a barrier panel that is located above the plinth and extends between the posts.

20. A fence comprising two spaced apart posts, a barrier panel extending between and mounted to the posts, and a plinth located below the barrier panel, wherein the posts include respective channels that face towards one another, and the plinth is formed from sheet material having spaced apart edge margins located within the channels and mounted thereto, the sheet being profiled to

incorporate stiffening formation that extends along the sheet between the posts.

21. A fence comprising two spaced apart posts, a barrier panel extending between the posts, and a plinth located below the barrier panel, wherein the posts includes respective channels that face toward one another, and the plinth is formed from sheet material having spaced apart side edges and end edge margins that interconnect the side edges, the sheet being profiled to extend laterally out of a notional centre plane extending between the upper and lower edges so that the edge margins of the plinth locate snugly within the channels.

22. A fence as claimed in claims any one of claims 19 to 21, wherein the barrier panel comprises upper and lower rigid rails, and infill means extending from rail to rail.

23. A method of forming fence plinths comprising the steps of:

profiling a pre-painted galvanised steel strip to incorporate longitudinal extending stiffening formations in the strip; and

shearing the strip at discrete lengths to form the plinths.

24. A method as claimed in claim 23, wherein the strip is profiled using a roll-forming process.

25. A method as claimed in either claim 23 or 24, wherein the strip is bent to form the stiffening formations and wherein the radius of curvature of the bends are greater than 5mm.

Dated this 28th day of October 2004

GRAM ENGINEERING PTY LTD

By their Patent Attorneys

GRIFFITH HACK

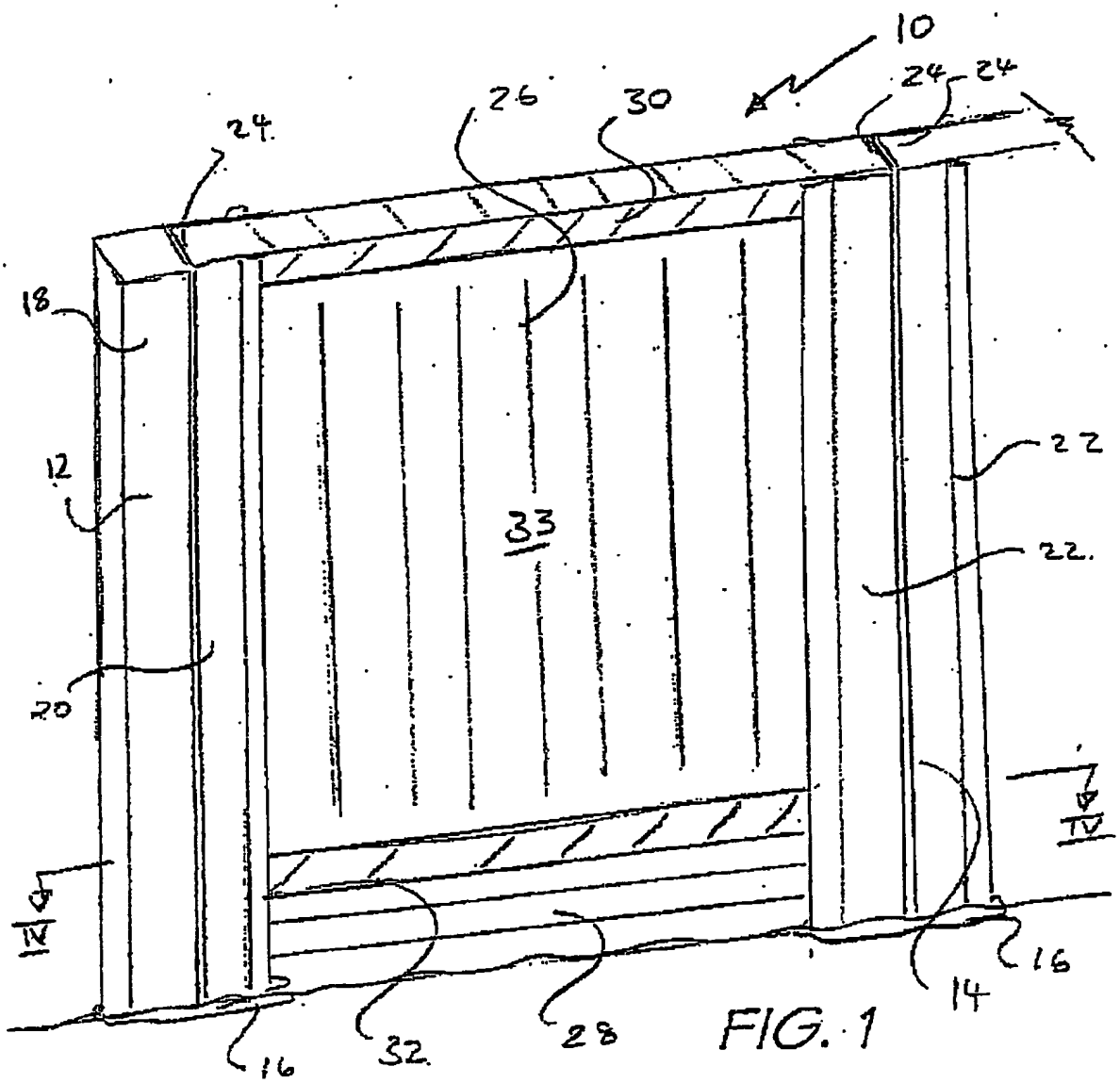

FIG. 1

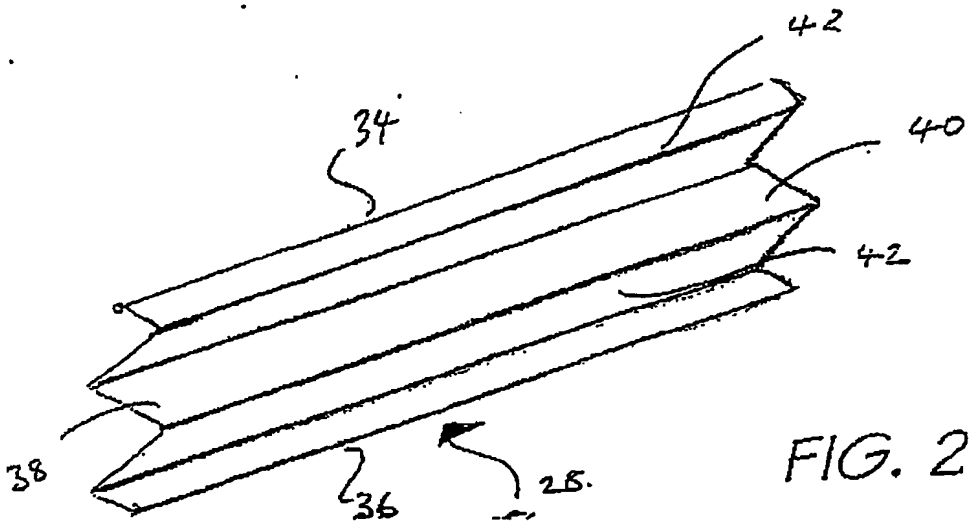

FIG. 2

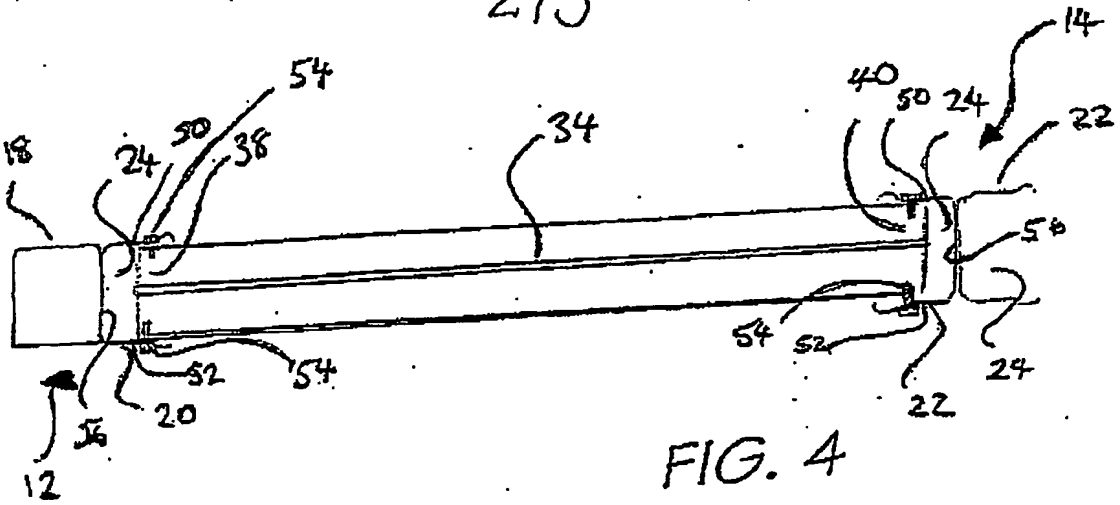

FIG. 4

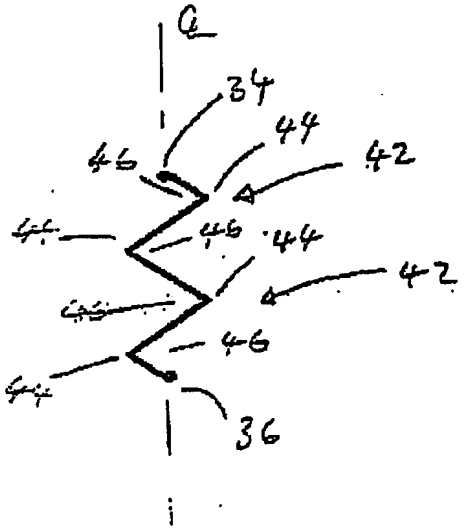

FIG. 3

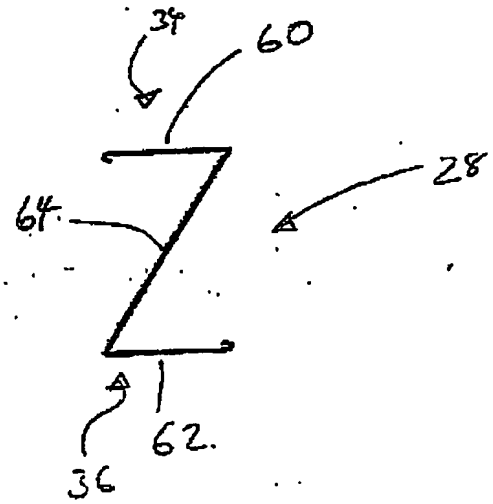

FIG. 5

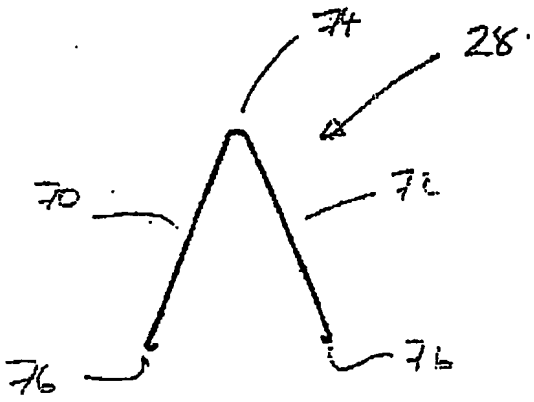

FIG. 6

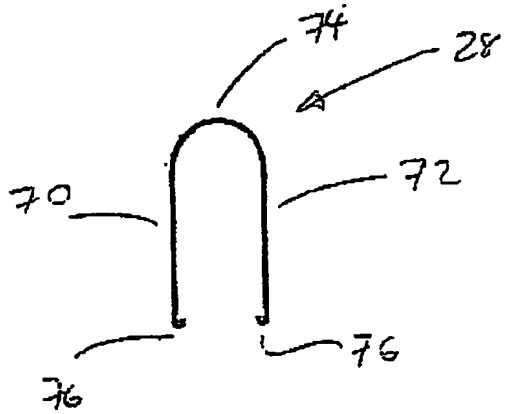

FIG. 7

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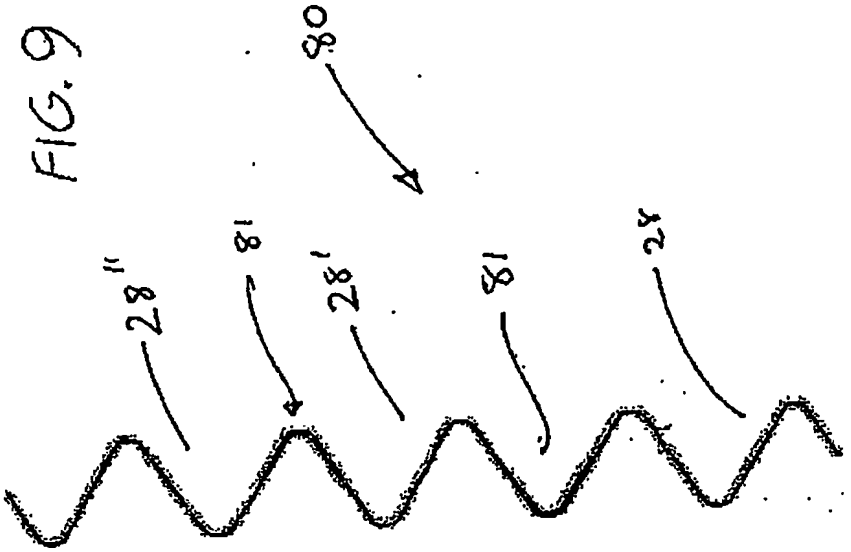
FIG. 9



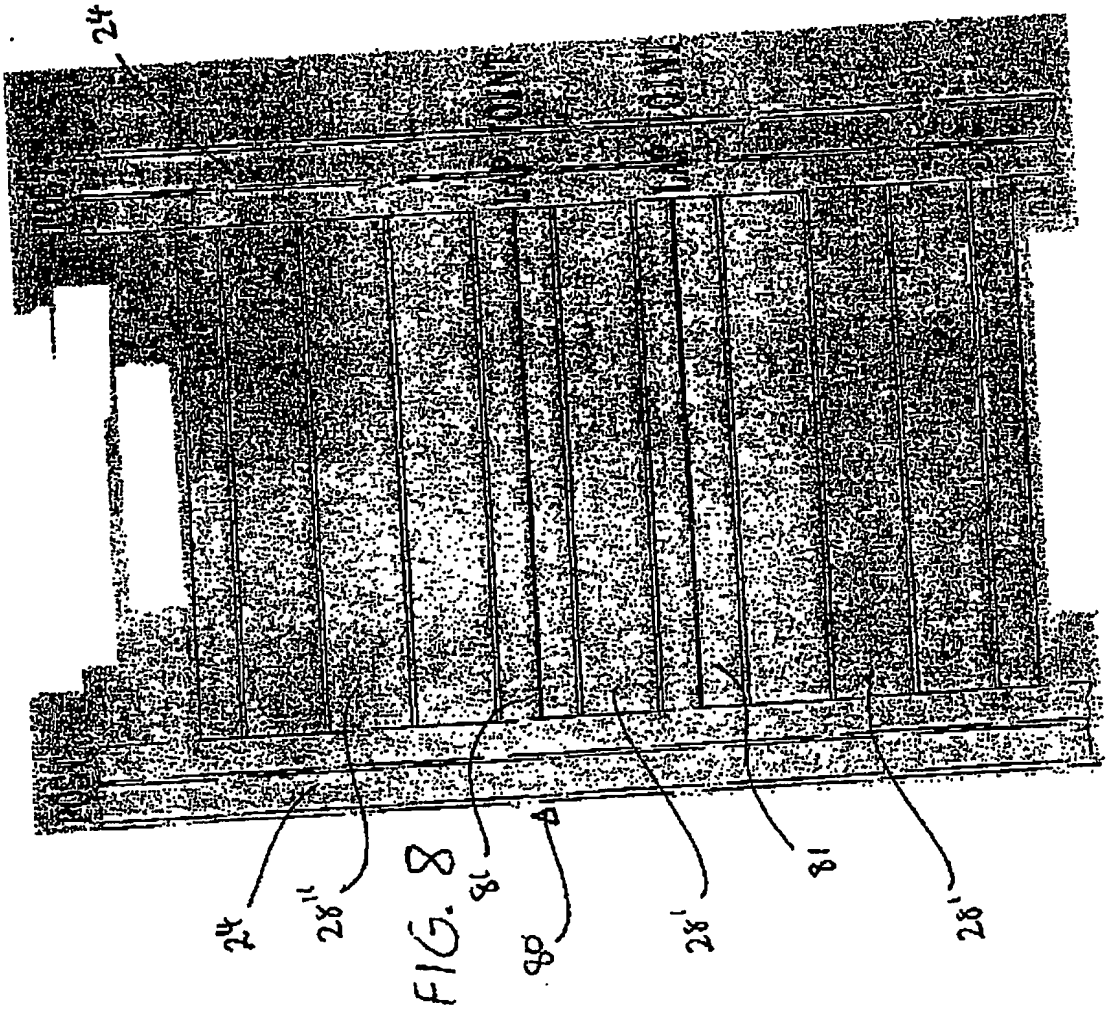


FIG. 8

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